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Security Economics: A Guide for Data Availability and Needs

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Security Economics: A Guide for Data Availability and Needs

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Abstract

The rapid and accelerating development of security economics has generated great demand for more and better data to accommodate the empirical research agenda. The present paper serves as a guide to policy makers and researchers for security-related databases. The paper focuses on two main issues. Firstly, it takes stock of the existing databases, highlighting their main components and also performs a brief statistical comparison. Secondly, it discusses data shortages and needs that are considered essential for enhancing our understanding of the complex phenomenon of terrorism as well as designing and evaluating policy.

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1. Introduction

Security Economics is a newly developing discipline that aims at measuring the economic impacts of terrorism. Moving to the quantification of these impacts one may distinguish between direct and indirect effects that range across a wide spectrum of economic actors' decisions and markets. In general the negative impact of terrorism-driven insecurity on the economy can be presented in terms of an 'insecurity tax'. Terrorist activity generates various direct costs such as the loss of life and property damages, but also the portion of fiscal expenditures directed to counter-terrorism. Among terrorism's indirect costs one may include the reduction in economic activity taking the form of lower FDI flows (Enders and Sandler 1996; Abadie and Gardeazabal 2005), lower international trade (Nitsch and Schumacher 2004), lower tourism demand (Enders and Sandler 1991; Fleischer and Buccola 2002; Pizam and Fleischer 2002; Drakos and Kutan 2003; Llorca-Vivero, 2008), and lower GDP growth (Abadie and Gardeazabal 2003; Blomberg, *et al*, 2004). In addition, significant losses have been established in stock market capitalization as a consequence of terrorism (Chen and Siems 2004; Carter and Simkins 2004; Drakos 2004; Eldor and Melnick 2004; Karolyi and Martell 2005; Amélie and Darné 2006; Athanassiou *et al*, 2006; Gulley and Sultan 2006; Chesney and Reshetar 2007).

The rapid and accelerating development of security economics has generated great demand for more and better data in order to accommodate the empirical research agenda. The present paper serves as a guide to policy makers and active researchers for security-related databases. The paper focuses on two main issues. Firstly, it takes stock of the existing databases, highlighting their main components and also performs a brief

statistical comparison. Secondly, it discusses data shortages and needs that are considered essential for enhancing our understanding of the complex phenomenon of terrorism, as well as, designing and evaluating counterterrorism policy.

There have been two previous papers dealing with the issue of terrorism databases. Fowler (1981) presented a comparison of existing, at the time, databases paying special attention to their scope and content and the systems used for data retrieval. More recently Schmid (2004) offered an up to date review of existing terrorism databases and also explored various issues by performing statistical analysis. A major advantage of Schmid's study is the in depth analysis of the several drawbacks of databases.

The present study could be seen as a natural descendant of this line of papers. However I have made an attempt not to replicate or revisit their main parts. The value added of this study is twofold. First, apart from the comparison of existing databases on terrorism, it extends the information sources to other databases traditionally not employed in terrorism research. Second, and perhaps more important, it provides a critical assessment of what data is needed from the point of view of the applied researcher.

2. Required Qualitative and Quantitative Properties of Datasets

Before I proceed to a description of the available terrorism databases it would be fruitful to give a background discussion regarding the required properties of datasets from the viewpoint of an applied researcher. The applied researcher conducts econometric / statistical analysis based on available data for three main purposes: (i) explain the past, (ii) predict the future, and (iii) provide policy advice. Given these three main purposes, one identifies the following properties that a database should possess:

- **Relevance and transparency of definition:** the working definition of terrorism should reflect a scientific view of what - and what does not - constitute terrorism activity, rather than represent contextual and politically-driven motives. In addition, the definition should be transparent, minimizing the scope for ambiguities and / or borderline cases. However, the definition should be broad and flexible enough to accommodate the potential emergence of new types of terrorism in the future.
- **Spatial and intertemporal consistency:** the adopted definition used in the collection of data must be consistent both over time and across regions. The intertemporal stability is essential to allow a meaningful time series analysis of the terrorism process and its effects. Furthermore, the delicate transition from comprehending the past to predicting the future depends crucially on the intertemporal stability of definition. Similarly, the definition of terrorism must be consistent across regions. From an econometric point of view this consistency is required in order to allow cross-country analysis. The spatial and intertemporal consistency is essential for arriving at meaningful comparisons on various dimensions such as terrorism hazard, terrorism consequences, and counterterrorism effectiveness.
- **Operational and exhaustive reporting:** the reporting of terrorism data must be operational in order to accommodate the econometric analysis. In particular, one identifies two elements for which operationalization is important. Firstly, in several cases the level of disaggregation must be fine enough (for instance at a regional or micro level). Secondly, when possible, providing direct numeric measurement (for instance terrorism's direct consequences, agents' willingness to pay to avoid the risk of terrorism). Furthermore, any dataset must be exhaustive both cross-nationally and

intertemporally (i.e covering all years and all countries). Moreover, the coding of a terrorism incident must incorporate, when possible, all important incident attributes (i.e. types of attack, weapons used, type of target, perpetrator, number and nationalities of terrorists involved, number and nationalities of victims, number of casualties, property damages, etc).

3. Existing databases

A distinctive feature of terrorism data is the lack of a unique and comprehensive database. The non-uniqueness is partly explained by the fact that social scientists (primarily political scientists) have treated domestic and transnational terrorism as separate processes, leading to the compilation of different databases. In addition, the absence of a centralized body dealing with terrorism also led to the establishment of independent databases where in some cases they reflect the collector's interests.

The non-comprehensiveness of databases reflects the complexity of the terrorism phenomenon *per se* and also the multitude of sources from which data are collected (usually open sources such as the media and in some cases local police reports). The occurrence of a typical terrorist incident offers limited information that can be directly coded in databases. For instance, the two most obvious and undisputable attributes of any event are the **location** (country, city / town) and the **timing** (day / month / year). For all other related, but essential for research, aspects there is usually some degree of uncertainty. Starting with the observable attributes of terrorist events, the **type of attack** is relatively easier to establish (bombing, kidnapping, arson etc.), while **human casualties** (dead and wounded) are not always reported with precision, a problem that is even more pronounced for **property damages**. Attributes related to the actual

perpetrators are even harder to pin down. In particular, given that in the vast majority of cases terrorists flee the scene or die at the scene, it is rather difficult to ascertain which **terrorist organization** carried out the attack, who the exact **target** was and what was the **aim** of the attack. For most cases that such information is available, the source is the terrorists themselves who claim responsibility and usually provide partial answers regarding the target, their motives and aims. Note however that for a sizeable portion of terrorist incidents there is no claim of responsibility or in fewer cases there are multiple (and sometimes competing) claims of responsibility. In addition, the **logistical effort** of terrorists is usually not known, *i.e* we do not have information regarding the **number of terrorists** that were involved, the **weapons deployed**, let alone issues such as the **time and resources** devoted for **planning** the attack.

3.1 Main terrorism databases: terrorism definition and available related variables

The main terrorism databases that basically correspond to chronologies of terrorist events are:

1. **International Terrorism: Attributes of Terrorist Events** *(ITERATE)*
2. **Terrorism in Western Europe: Events Data** *(TWEED)*
3. **Global Terrorism Database** (*GTD)*
4. **World Incident Tracking System** (*WITS)*
5. **Memorial Institute for the Prevention of Terrorism** (*MIPT)*
6. *RAND* database.

The last two have merged and access to the dataset at the time this paper was written was not possible, while the *WITS* database covers the post 2004 period. Therefore in what follows I will discuss the other three databases.

One of the oldest and most widely used databases is *ITERATE* covering the period 1968-2007, which focuses on transnational terrorism and was developed by Edward Mickolus, Todd Sandler, Jean Murdock and Peter Flemming (2007). The working definition of international/transnational terrorism used by the ITERATE is:

> *"... the use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through the nationality or foreign ties of its perpetrators, its location, the nature of its institutional or human victims, or the mechanics of its resolution, its ramifications transcend national boundaries. International terrorism is such action when carried out by individuals or groups controlled by a sovereign state, whereas transnational terrorism is carried out by basically autonomous non-state actors, whether or not they enjoy some degree of support from sympathetic states. "Victims" are those individuals who are directly harmed by the terrorist incident. While a given terrorist action may somehow harm world stability, citizens of nations must feel a more direct loss than the weakening of such a collective good".*

Jan Engene developed *Terrorism in Western Europe: Events Data* (*TWEED)*, a database covering terrorism events in 18 countries in Western Europe for the time period 1950 to 2004. The *TWEED* data set only includes events initiated by agents originating in the West European countries and therefore transnational terrorism is not considered (see Engene 2006). The *TWEED* dataset is based on a single news source: Keesing's Record of World Events (Keesing's Contemporary Archives). The working definition is:

> "*As an act of terrorism is counted an act that has inflicted personal injury, or attacks against material targets (property) if the act is of a nature that could have led to personal injury or in another way would have a noticeable impact on an audience, while at the same time the act was committed to direct demands of or raise attention from others than those immediately inflicted with personal or material injury. On the basis of the form of the entries and the information available in Keesing's the operational definition in section 3 is used. 3. The following events are counted as violent actions of a terrorist nature: Bombings, explosions, arson, fires, rocket attacks, killings, attempted killings, abductions, kidnaps, shootings, sieges, violent actions, violent attacks, attacks and similar violent actions. The event must be brought about by an agent that has deliberately initiated the action".*

The most recent database is the *Global Terrorism Database* (*GTD*) developed by Gary LaFree and Laura Dugan at the University of Maryland, containing both domestic

and international incidents. The database consists of two distinct parts; (*GTD1*) it records worldwide events for the period 1970 to 1997[1] and (*GTD2*) for the period 1998 to 2004 (see LaFree and Dugan 2007a, 2007b, 2007c). The working definitions are as follows:

(GTD1). "*In order to be considered a "terrorist incident" the event had to have been committed by nonstate actors, had to have been violent, and intentional. In addition the act must have met two of the following three criteria: (1) The act must have been aimed at attaining a political, economic, religious, or social goal. In terms of economic goals, the exclusive pursuit of profit did not satisfy this criterion. (2) There must have been evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims. (3) The action must have been outside the context of legitimate warfare activities, i.e. the act must have been outside the parameters permitted by international humanitarian law (particularly the admonition against deliberately targeting civilians or noncombatants)".*

(GTD 2). "*Throughout the data collection period PGIS employed a broad definition of terrorism: the threatened or actual use of illegal force and violence to attain a political, economic, religious, or social goal through fear, coercion, or intimidation".*

Table 1 reports the main variables offered in the three databases are presented in Tables 1[2].

----------***Table 1***----------

3.2 Relationship between Databases: A Statistical Overview

A direct comparison of the three databases is not possible for two reasons. Firstly, the *GTD* includes both domestic and transnational incidents while *ITERATE* and *TWEED* include only transnational and domestic incidents respectively. Hence I proceed with a merging (essentially 'adding' events) of *ITERATE* and *TWEED* by year and country in order to accommodate a comparison with *GTD*. Secondly, and perhaps most importantly, the databases do not employ an identical definition of terrorist activity. Thus, if not anything else, the comparison will highlight any differences attributed to the diversity of definitions. Another cautionary note is in order, since according to the user guide the

[1] Data for 1993 are not available
[2] The interested researcher should check the availability on a variable basis since for a substantial number of them data are missing.

GTD2 database should neither be merged nor compared to *GTD1* because the data were collected using different methods and often different data definitions. Despite this I treat *GTD* as a homogeneous dataset since the main analysis that will follow does not look into the dynamics of terrorism but rather compares different databases.

3.2.1 Overall time series trajectories

Graph 1 depicts the time series paths of total terrorist incidents in 15 European countries for the databases[3].

----------***Graph 1***----------

Inspection of the time plots reveals a clear disparity between the two databases in terms of the total number of terrorist attacks reported by year. Moreover, the disparity is not consistently moving in one direction. *i.e GTD* always higher (lower) than the combined *TWEED* and *ITERATE*. However for the majority of years *GTD* reports a higher number of incidents. Graph 2 shows the ratio of total terrorist incidents reported in the two datasets.

----------***Graph 2***----------

If the two sources provided similar information their ratio would be close to 100, a property that clearly is not satisfied. In fact the average value of their ratio is 128 % ranging between 17.5 % to 374 %. On the other hand, irrespectively of which data source is chosen, a clear decrease in the overall number of incidents on an annual basis is apparent. The visual evidence for a drop in total incidents is statistically supported by a simple regression of each database's attacks on a linear time trend. Graph 3 depicts the relevant findings.

[3] Attacks in Northern Ireland and Corsica have been added in UK and France respectively.

----------***Graph 3***----------

Table 2 summarizes the estimates from the above mentioned regressions.

----------***Table 2***----------

Again dissimilarities are apparent in terms of the rate of decrease in terrorist attacks, since for *GTD*, I document that terrorist attacks have been decreasing by an average of 10 attacks per year while for the combined *ITERATE-TWEED* the corresponding drop is about 17 attacks per year.

3.2.2 Similarity of Databases Information: Country and Time Correlations

Table 3 reports the terrorist incidents by country that the two data sources include.

----------***Table 3***----------

Again if the two sources provided similar information their ratio would be close to 100. On average the actual ratio is 104 with a standard deviation of 70, ranging from a minimum of 41 (for the case of Portugal) to a maximum of 251 (for the case of Italy).

To further investigate the relationship of the two data sources I provide the sample correlation coefficients between the joint *TWEED* and *ITERATE* data with data from *GTD* by country. Graph 4 depicts the correlation coefficients from this exercise. The similarity of databases differs markedly depending on the country, ranging from 0.82 (Belgium) to 0.04 % (for Netherlands). This implies that even though it appears that the two data sources provide in certain cases similar overall information this masks the fact that for a given country the distributions of included incidents across time differ substantially. The average correlation on a country level is 0.4191.

----------***Graph 4***----------

The cross-sectional relationship of databases, *i.e.* 'holding time constant' and allowing variation across countries is captured by the correlation coefficients by year. Graph 5 shows the sample correlation coefficients. Again the similarity of databases varies substantially depending on the year, ranging from 0.27 (in 1982) to 0.99 (in 1974), while the correlation is 0.69 on average.

----------***Graph 5***----------

3.2.3 Longitudinal (Time series-country level)

So far the analysis has focused on the comparison of databases on certain dimensions and now turns to a holistic view where I focus on the panel dimension considering cross-sectional (across countries) and time series (across years) variations simultaneously.

----------***Table 4***----------

The overall coefficient of determination of the model is only 20 % and this is decomposed into about 6 % explanatory power for the within variation and about 76 % for the between variation. These results simply verify and, of course mirror, the findings from the previous analysis. Thus it becomes apparent from the comparison of databases that they provide a better picture regarding differences between countries but when it comes to variation across time on a country basis (within country) they offer quite different information.

3.3 Information included in other sources

The vast majority of academic research has relied on data from chronologies such as the ones described earlier. In the following section I would like to bring to the

researchers' attention data, and other general information, located in alternative sources that could be used in applied work to complement data from chronologies.

3.3.1 Europol reports

Since 2007 the Europol publishes an annual report entitled **Terrorism Situation and Trend Report** (*TESAT*) for member states, covering a number of aspects that could potentially be useful for academic research. The data appearing in *TESAT* cover **arrests**, **prosecutions** and **convictions** in the EU for **terrorist offences**. Table 5 provides a detailed list of the variety of quantitative data that appear in the TESAT reports by year.

----------***Table 5***----------

The value added of the TESAT reports is that they provide information for some dimensions of authorities' counterterrorism performance that as a rule do not appear in chronologies, and could be a useful complement for research. The main disadvantages of TESAT are its short time span and also the aggregate nature of the data that do not lend themselves to a deeper statistical analysis. Nevertheless collection of this sort of data, and especially in a centralized manner, could be of utmost importance.

3.3.2 Survey Data: Eurobarometer

Two uses of terrorism data have attracted considerable attention in the empirical literature. The first relates to the exact date that an incident took place and then attempting to identify whether there were significant adverse economic impacts on that day or for a short period after the attack occurrence. Typical applications focus on the potential effects on capital markets. The second, instead of relying on the exact incident date, it rather aggregates incidents over a given interval (month, quarter, year) in order to

construct a measure of terrorist activity intensity and then proceed with the measurement of potential negative impacts on various dimensions of economic activity.

Another possibility, perhaps of equal value from a research point of view, could be to investigate the terrorism's and/or organized crime's indirect effects in the form of causing a change in agents' (households, firms, etc.) economic behavior. Thus, if data regarding the perception of insecurity risk or insecurity-driven uncertainty were available they could provide significant value added to research.

To this end a database that could in principle be proved indispensable, namely the *Eurobarometer* which is a micro-level survey focusing on individuals, falls short of one's expectations. For instance, the *Eurobarometer* questionnaires only started to include questions related to terrorism in 2002. Moreover, the actual number of questions is extremely small (ranging from 1 to 6 questions, depending on the issue-year). However, a closer inspection of the questionnaires reveals a further drawback, since some of the questions do not appear continuously in all issues, while for other questions one finds similar phrasing but not identical in subsequent surveys. In table 6 I take stock of the terrorism-related questions also indicating the issue in which they appear. As it turns out the only questions that have a relatively longer record of inclusion are questions regarding to (i) **whether the fight against terrorism should be an EU policy priority**, (ii) **whether individuals perceive terrorism as one of the most important problems their country is facing**, (iii) **whether decision making regarding the fight against terrorism should be done at the national or EU level and to a lesser extent** and (iv) **whether the EU has played a positive or not role in the fight against terrorism**.

----------***Table 6***----------

4. (In-) Security data needs and proposals for collection mechanisms

The non-canonical nature of security related data and the diverse goals of final users make the actual collection of data, and the subsequent compilation of databases, a very challenging task. As it has become apparent from the previous sections the only systematic data collection process so far has been in the form of terrorist events chronologies that suffer from their fundamental collection criterion, which is the occurrence of an event. Hence databases are either heavily lopsided towards including event-driven information, or ignore altogether other equally important aspects of the terrorism generation process that go beyond a single event's attributes and profile.

In addition, chronologies are primarily, if not exclusively, based on open public sources such as the media. This open-source dependency masks a number of lurking risks that greatly affect the coverage and quality of data. Firstly, the well-know statistical problem of reporting bias cannot be fully avoided especially in non-democratic countries where the media are either controlled or in some degree censored (Drakos and Gofas 2006; 2007; Drakos 2007). Secondly, the media might cover terrorist attacks provided that they pass a certain scale, and as a result it is plausible that some terrorist activity has gone undetected (Rohner and Frey 2007). Thirdly, the media report information that is readily available and only directly linked to the incident. Finally, chronologies by simply tracing observed terrorist activity do not provide information for more general and event-unrelated, but otherwise vital, aspects of the underlying terrorism generation process.

The above mentioned problems of existing data collection methods is indicative of the corrective measures needed, but also of the new avenues that could be followed. What becomes immediately apparent is that we need a more systematic, a wider and

more comprehensive data collection mechanism. In general what is needed is not a mere upgrade of collection methods, but in fact a change of its philosophy. This new philosophy should be based on two pillars. The first pillar would be to build on the undeniable heritage of terrorism event chronologies, by ensuring the exhaustiveness of collected data (event-wise) and the broadening of event-related attributes. Extending the fieldwork to include government agencies and NGOs seems necessary in order to succeed in this.

The second pillar, and perhaps the most important, requires the disengagement of terrorism databases from events themselves. From a purely statistical point of view terrorist events are the mere realization of a more general stochastic process that generates them. There is only so much that can be said for this process from the study of the timing, the frequency and the attributes of terrorist events. Policy making, academic discourse and policy design, would be greatly benefited if databases focused on more general and enduring issues, what one would call the **fundamentals of terrorism process**. As I implied in previous sections these fundamentals, go beyond the terrorist events *per se*, require a systematic and extensive information gathering on the behavior, actions, attitudes and perceptions of the agents involved. This brings at centre stage the collection of data for (i) counterterrorism's overall conduct, (ii) private security, (iii) terrorist groups' conduct and (iv) individuals' and firms' terrorism risk perception and welfare effects.

4.1 Counterterrorism: pecuniary and non-pecuniary aspects

An apparent gap is the almost total absence of data regarding counterterrorism, which is one of the major co-determinants of terrorist activity and its consequences. The

lack of data has severely restricted academic output, which amounts to only a handful of academic studies (for a review and a recent application see Drakos and Giannakopoulos, 2009).

Data on counterterrorism expenditures would be instrumental for measuring its effectiveness and also for performing cost-benefit analysis. With regard to counterterrorism effectiveness, one could measure whether anti-terrorism expenditures do result in lower terrorist activity intertemporally and / or cross-nationally. Moreover, these expenditures could be used to compare them with the direct and indirect costs of terrorism activity. Furthermore, knowledge of the exact nature of counterterrorism expenditures could allow a horizontal comparison (*i.e* across types) in order to improve the efficiency of spending by identifying potential re-direction of funds. Data on counterterrorism expenditures could be obtained from national (and / or local government) budgets although one expects that there will be substantial comparability, and possibly confidentiality, issues.

Apart from expenditures, other non-pecuniary aspects of authorities conduct, such as terrorism-related arrests, indictments and sentences would also assist us towards obtaining a more complete picture of counterterrorism. All datasets on terrorism actually correspond to instances that a terrorist act was initiated. Hence these datasets suffer from a rather peculiar selection bias, since the researcher is not offered information either for the number of terrorist attacks that were dissuaded or prevented by counterterrorism. Thus, information about the discouragement-disruption-interception of (planned) terrorist activities would enhance our knowledge of counterterrorism conduct.

4.2 Private sector security: demand and supply side

It is obvious that the authorities' counterterrorism expenditures provide an underestimate of society's incurred security costs. In order to have a complete picture we need to take into account (i) the private sector's (households and firms) security expenditures and (ii) the private sector's insurance payments. These data would complement the direct costs of terrorism activity and terrorism risk, and thereby provide important elements needed to conduct cost-benefit analysis. Information can be obtained from standard micro-level surveys such as the Eurobarometer and the National Statistical Agencies.

In addition, useful information can be obtained by acquiring data from the insurance market's supply side, with regards to terrorism insurance coverage, risk premia, and insurance policies. Such data would be useful to assess the depth (or thinness) of the particular industry and the subsequent (in-) ability to hedge against terrorism risk. Moreover, policy makers could spot potential market failures and / or imperfections that would call for a government intervention (for instance in the form of new regulation, subsidization etc). These data could be collected by National Statistical Agencies that routinely survey the insurance industry.

4.3 Terrorist groups' conduct

A limited -and of poor quality- information is available with regard to terrorist groups. In particular, research on terrorism has so far exhibited very low progress on modeling various aspects of the actual perpetrators. Issues that remain unresolved to a large extent due to data unavailability are group demographics, linkages, scope of operation and methods of financing and recruitment. Regarding group demographics, very little is known as to the causes that terrorist groups emerge and / or seize operation.

No terrorism database as such provides any information about how many terrorist groups are in operation worldwide, and as it turns out there is not even an objective indicator that could classify groups across different regimes (for instance: active, non-active, dormant). Similarly one gets very vague information for group linkages, for instance in the form of synergies at various levels (recruitment, operational, financing etc). Another important set of information that would greatly augment security research is the financing of terrorism organizations, and also further issues such as the potential links between organized crime and the financing of terrorism (see Schneider 2002, 2004; Bovenkerk and Chakra 2004; Napoleoni 2004; Ward 2004). The unavailability of data concerning the scope of operation of terrorist groups is another grey area that acts as an impediment to research. There is no formal coding of terrorist groups geographical scope of operation or their logistical capabilities, including recruitment, access to weapons and sources of financing. Hence, this lack of data creates difficulties in risk analysis and threat assessment. Information on arrests, indictments, sentences and on some terrorist group characteristics is currently collected by EUROPOL. However, this information could be useful provided that it is extended to cover the dimensions discussed above and also if access to micro level data was granted.

4.4 Terrorism risk: perception and welfare effects

Past research has largely ignored the psychological effects of terrorism activity and the related terrorism risk perception, which may have substantial adverse effects. For instance, via its effects on agents' decision making, it may lead to suboptimal choices that otherwise would not be made (Elster 1998; Hermalin and Isen 2003). Moreover, there be large welfare effects by the corresponding disutility they cause to agents (Frey *et al*.

2007). Thus, micro-level (individuals, firms) data on the social (including psychological and happiness effects) impact of terrorism, and also on risk perception would improve our ability to understand and design policies to deal with this complex social phenomenon. Furthermore, we have no information whatsoever regarding individuals' willingness to tolerate increased security costs, either in the form of direct pecuniary payments or in the form of a trade-off between security and various civil liberties. This kind of data could be relatively easy to collect through the standard collection mechanism of the Eurobarometer.

5. Conclusions

The rapid and accelerating development of security economics has generated great demand for more and better data to accommodate the empirical research agenda. The present paper serves as a guide to policy makers and active researchers for security-related databases' availability and furthermore discuses data needs. The paper focuses on two main issues. Firstly, it takes stock of the existing databases highlighting their main components and also performs a brief statistical comparison. Secondly, it discusses data shortages and sketches data needs as well as the collection mechanisms of security-related data.

The main conclusions derived from the analysis are that terrorism chronologies, although of unquestionable value, fail to cover several important dimensions of the terrorism fundamentals, and therefore must be complemented by other databases. In particular, a change of philosophy is required in order to produce these new databases that will provide hard data for terrorist groups' behavior, counterterrorism activity and micro level perceptions and responses to terrorism.

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Tables

Table 1. Main variables appearing in databases				
	ITERATE	***TWEED***	***GTD1***	***GTD2***
Incident Characteristics				
Date of start of incident	√	√	√	√
Country	√	√	√	√
Scene of incident	√		√	√
Evidence of state sponsorship	√		√	√
Type of state sponsorship	√			
Type of incident	√	√	√	√
Total number of nationalities involved in incident	√			
Responsibility Claim				√
Mode of claim				√
Confirmed claims				√
Additional claims				√
Competing claims				√
Terrorist Characteristics				
First / second /third group initiating action	√	√	√	√
Number of terrorist groups directly involved	√			√
Number of terrorists in attack force	√			√
Number of female terrorists in attack force	√			√
Number of nationalities of terrorists in attack force	√			
First / second / third nationality of terrorists in attack force	√			
Recidivists in attack force	√			
Group's ideological character		√	√	√
Victim Characteristics				
Number of victims	√	√	√	√
Number of nationalities of victims	√			
First / second / third victim's nationality	√		√	√
Number of United States victims	√			√
Type of United States victim	√			
Type of immediate victim	√	√		√
Nature of victim entities	√			√
Life and Property Losses				
Total individuals wounded	√	√	√	√
Terrorists wounded	√		√	√

Foreign wounded	√			
United States wounded	√			√
Government officials wounded	√			
Total number of individuals killed	√	√	√	√
Terrorists killed	√		√	√
Foreign killed	√			
United States killed	√			√
Government officials killed	√			
Property damages	√		√	√
Extend (amount of damage)	√			√
Type of weapon used	√	√	√	√
Terrorist logistical success: stopped by authorities	√			
Terrorist logistical outcome: success	√		√	√
Terrorist logistical outcome: failure	√		√	√
Psychosocial Consequences				√
State action: Arrests		√		
State action: Convictions		√		
State action: *Executions*		√		

Table 2. Regression of Total terrorist attacks on linear time trend		
	GTD	**TWEED + ITERATE**
Intercept	530.41*** (8.34)	685.50*** (8.98)
Linear time trend	-9.89*** (-3.06)	-17.64*** (-4.57)
R-squared	22.65%	38.77%
Notes: Three asterisks denote statistical significance at the 1 % level.		

Table 3. Total Terrorist Attacks by country (1970-2004)			
Country	**TWEED + ITERATE**	**GTD**	**Ratio (%), GTD to ITERATE-TWEED**
Austria	115	93	80.87
Belgium	192	128	66.67
Denmark	40	42	105.00
France	3570	1817	50.90
Germany	1159	617	53.24
Greece	689	731	106.10
Ireland	163	126	77.30
Italy	584	1466	251.03
Luxemburg	6	15	250.00
Netherlands	211	109	51.66
Norway	20	14	70.00
Portugal	300	123	41.00
Spain	1390	2872	206.62
Sweden	63	48	76.19
UK	4878	4078	83.60

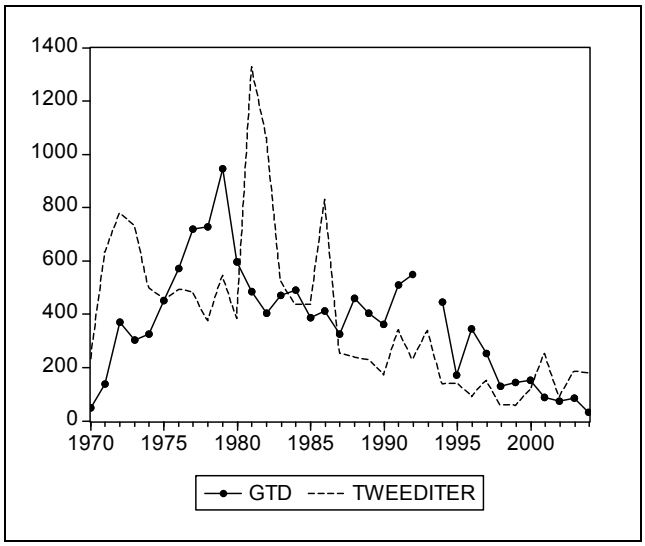
Table 4. Regression of TWEED + ITERATE on GTD			
	Pooled (OLS)	**Fixed-Effects**	**Random-Effects**
	Estimate (z-score)		
Intercept	7.16^{**} (2.10)	13.06^{****} (3.67)	10.07^{*} (1.86)
GTD	0.7489^{***} (11.75)	0.4895^{****} (5.63)	0.6207^{****} (8.21)
R-squared (overall)	20 %	20 %	
R-squared (within)	-	5.68 %	
R-squared (between)	-	76.52 %	
Notes: One, two, three asterisks denote statistical significance at the 10, 5, and 1 % level respectively.			

Table 5. Variety of quantitative data appearing in Europol's Terrorism Situation and Trend Report (TESAT)	
Data for	**Appearing in**
Number of failed, foiled and successfully executed attacks and number of arrests	**TESAT 2008, TESAT 2007**
Number of arrested suspects per member state and affiliation	**TESAT 2008, TESAT 2007**
Number of individuals tried for terrorism charges per member state	**TESAT 2008, TESAT 2007**
Number of verdicts for terrorism charges per member state and affiliation	**TESAT 2008**
Number of verdicts, convictions and acquittals per member state	**TESAT 2008, TESAT 2007**
Average penalty per convicted individual per member state	**TESAT 2008, TESAT 2007**
Percentage of arrested suspects for Islamist terrorism per offence (Membership Terrorist Organization, Facilitation, Attack Related Offences, Financing, Recruitment, Propaganda, Training)	**TESAT 2008**
Terrorist Activity per Age Group (activity: Recruitment, Preparation, Attack, Attack Facilitation, Financing, False Documents, age groups: 18-29, 30-41)	**TESAT 2007**

Table 6. Variety of questions appearing in Eurobarometer questionnaires	
Question[a,b]	**Appearing in**
Do you tend to agree or tend to disagree with that "enlargement will help to fight against terrorism"	**EB 56.3 (Jan.-Feb. 2002)**
Do you think action taken by the European Union is, or would be very effective, fairly effective, not very effective, or not at all effective in "Fighting organized crime and drug trafficking"	**EB 56.3 (Jan.-Feb. 2002), EB 58.1 (Oct.-Nov. 2002), EB 60.1 (Oct.-Nov. 2003)**
Out of a list of actions that the European Union could undertake in your opinion, should be a priority, or not? "Fighting organized crime and drug trafficking"	**EB 56.3 (Jan.-Feb. 2002), EB 57.1 (Mar.-May 2002), EB 58.1 (Oct.-Nov. 2002), EB 58.2 (Oct.-Dec. 2002), EB 60.1 (Oct.-Nov. 2003), EB 62.0 (Oct.-Nov. 2004), EB 63.4 (May-June 2005), EB 64.2 (Oct.-Nov. 2005), EB 65.2 (Mar.-May 2006), EB 65.4 (June-Jul. 2006), EB 66.1 (Sep.-Oct. 2006), CCEB (2002.2), CCEB[c] (2003.1)[*]**
What do you think are the two most important issues facing (our) country at the moment? "Crime, Terrorism"	**EB 57.0 (Feb.-Apr. 2002), EB 58.2 (Oct.-Dec. 2002), EB 60.1 (Oct.-Nov. 2003), EB 61.0 (Feb.-Mar. 2004), EB 62.0 (Oct.-Nov. 2004), EB 63.4 (May-June 2005), EB 64.2 (Oct.-Nov. 2005), EB 65.2 (Mar.-May 2006), EB 65.3 (May-June 2006), EB 66.1 (Sep.-Oct. 2006), EB 66.3 (Nov.-Dec. 2006), EB 67.2 (May-Apr. 2007), CCEB (2004.1).**
Here is a list of things that some people say they are afraid of. For each of these, please tell me if, personally you are afraid of it, or not? "Terrorism, Organized Crime"	**EB 57.1 (Mar.-May 2002), EB 58.1 (Oct.-Nov. 2002), EB 58.2 (Oct.-Dec. 2002)**
For each of the following areas, do you think that decisions should be made by the (Nationality) Government, or made jointly with the European Union? "the fight against organized crime, the fight against international terrorism"	**EB 57.1 (Mar.-May 2002), EB 58.1 (Oct.-Nov. 2002), EB 58.2 (Oct.-Dec. 2002), EB 60.1 (Oct.-Nov. 2003), EB 62.0 (Oct.-Nov. 2004), EB 64.2 (Oct.-Nov. 2005), EB 65.1 (Feb.-Mar. 2006), EB 65.4 (Jun.-Jul. 2006), EB 66.1 (Sep.-Oct. 2006), EB 67.2 (May-Apr. 2007), CCEB (2001)[*], CCEB (2002.2)[*]**
I am going to read out a number of statements related to crime and crime prevention. For each one can you tell me whether you tend to agree or tend to disagree? "Organized crime has infiltrated the economy"	**EB 58.0 (Sep.-Oct. 2002)**
How much concern do you feel about each of the following problems? "Terrorism, Organized crime"	**EB 59.2 (May-June 2003)**
Could you tell me whether coordinated action at European Union level is very desirable, fairly desirable, not very desirable, not at all desirable? "Terrorism, Organized crime"	**EB 59.2 (May-June 2003)**
For each of the following issues (in our Country), do you think the European Union plays a positive role, a negative role, or neither positive nor negative role? "Fighting crime, Fighting terrorism"	**EB 60.1 (Oct.-Nov. 2003), EB 61.0 (Feb.-Mar. 2004), EB 62.0 (Oct.-Nov. 2004), EB 63.4 (May-June 2005), EB 65.2 (Mar.-May 2006), CCEB (2004.1).**
I will read you a list of potential risks. For each of them tell me how likely you think there are to happen to you personally? "Being the victim of crime, Being the victim of terrorism"	**EB 64.1 (Sep.-Oct. 2005)**
On a scale from 1 to 10 how would you judge the performance of the European Union in each of the following areas (1 means "not at all satisfactory", 10 means "very satisfactory") "The fight against crime, the fight against terrorism"	**EB 65.1 (Feb.-Mar. 2006)**
Notes: (a) the exact phrasing of questions has been adapted by the author, (b) "" indicates potential answers, (c) CCEB stands for Candidate Countries Eurobarometer, * denotes that terrorism was not among the potential answers.	

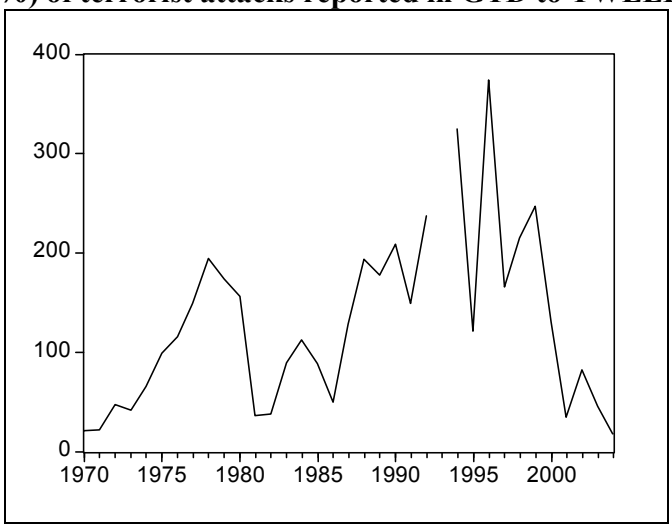
Graphs

Graph 1. Time Series Paths of GTD and TWEED + ITERATE



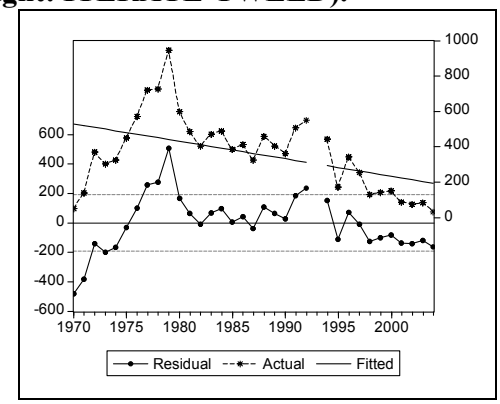
Notes: GTD does not provide data for 1993.

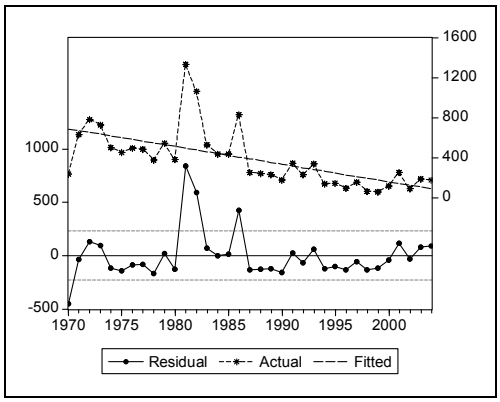
Graph 2: Ratio (%) of terrorist attacks reported in GTD to TWEED + ITERATE



Notes: GTD does not provide data for 1993.

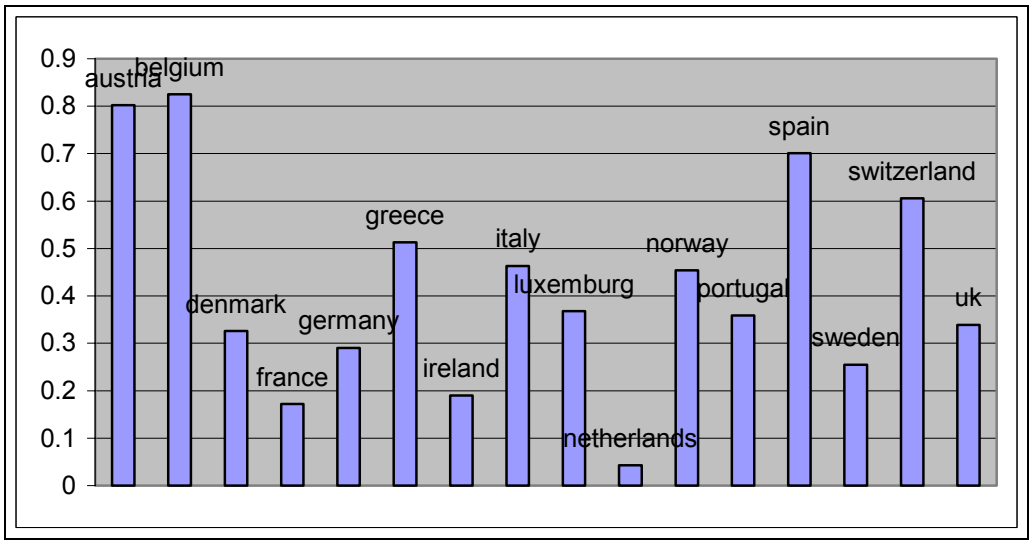
Graph 3. Fitting a linear time trend on GDT and ITERATE-TWEED. (left: GTD, right: ITERATE-TWEED).



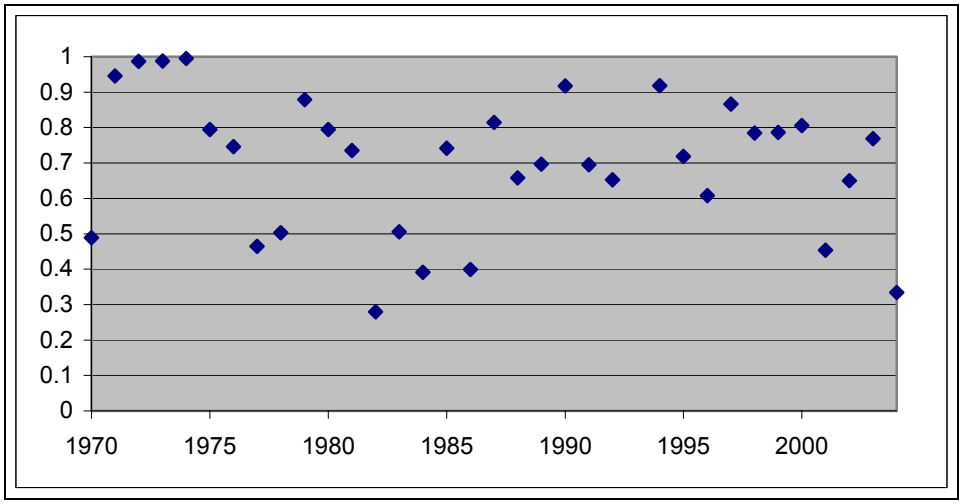


Notes: GTD does not provide data for 1993.

Graph 4. Correlations between TWEED-ITERATE and GTD by Country



Graph 5. Correlation between TWEED-ITERATE and GTD by Year



Notes: Correlation for 1993 not calculated due to missing data from GTD.